

REVISION OF THE GENUS *PYCNOTHELE* (ARANEAE, NEMESIIDAE)

Fernando Pérez-Miles and Roberto M. Capocasale

Instituto de Investigaciones Biológicas Clemente Estable
División Zoología Experimental
Ave. Italia 3318, Montevideo, Uruguay

ABSTRACT

On the basis of a character analysis, the genus *Pycnothele* and species attributed to *Androthelopsis* were revised and it was concluded that *Pycnothele* Chamberlin, 1917 = *Androthelopsis* Mello-Leitão, 1934. The genus *Pycnothele* comprises three species that are redescribed and illustrated: *Pycnothele auronitens* (Keyserling, 1891) (= *Androthelopsis modestus*: Raven, 1985 (in part.) and *Psalistops auripilus* Mello-Leitão, 1946 new synonyms); *Pycnothele perdita* Chamberlin, 1917; and *Pycnothele singularis* (Mello-Leitão, 1934) new combination (= *Pycnothelopsis modestus* Schiapelli & Gerschman, 1942 and *Androthelopsis modestus*: Raven, 1985 (in part) new synonyms). *Heteromma anomala* Mello-Leitão, 1934, although it belongs to *Pycnothele*, is an uncertain species. A taxonomic key is included for species identification.

INTRODUCTION

Pycnothele was created by Chamberlin (1917) based on the type of *Pycnothele perdita*, from Brazil. This genus includes medium-sized species (usually 20 to 30 mm in body length) found only in South America (Argentina, Brazil and Uruguay).

Schiapelli & Gerschman (1942) created the genus *Pycnothelopsis* and placed it together with *Pycnothele* in the family Pycnothelidae. These taxa were revised by Mello-Leitão (1934, 1946), Schiapelli & Gerschman (1942), Schiapelli & G. de Pikelin (1965, 1967, 1971), Gerschman de Pikelin & Schiapelli (1970), Capocasale & Pérez-Miles (1979), Pérez-Miles & Capocasale (1982, 1983) and Raven (1985). Recently Raven (1985) has analyzed the infraorder Mygalomorphae, clarifying the relationships of families. As a result of this analysis, *Pycnothele* and *Androthelopsis* were placed in the family Nemesiidae and *Pycnothelopsis* was designated as a junior synonym of *Androthelopsis*.

The repeated changes of place of the species of these genera and controversies among the authors reveal uncertainty about the correct placing of such taxa and their systematic relations. The diagnostic characters separating *Androthelopsis* and *Pycnothele*, apparently clear in the literature, appear to us to be inaccurate or conflicting. Doubtless, the low number of species in these genera has contributed to maintaining restrictive diagnostic criteria for them, a practice which we feel is unjustified. The small number of available specimens has also made the study of intraspecific variation difficult and prejudiced the specific diagnoses and identification.

As a result of the character analysis we have made on all material available in collections, (1) the species attributed to these genera are distinguished and characterized and (2) their systematic relations are clarified. The election of *Pycnothele* and *Androthelopsis* as a unit for study is based on the systematic proximity of these genera, which have traditionally been linked and are now considered sister groups (Raven 1985:45). A key conclusion of our present study is that *Pycnothele* = *Androthelopsis*.

METHODS

All drawings were made with a camera lucida and the measurements with an ocular micrometer; carapace measurements are accurate to 0.1 mm, eye and bulb measurements to 0.025 mm.

Computer programs were the Presta package developed in the Centro Ramón y Cajal, España. In the Student's *t*-test, the confidence limit was $P=0.05$; in the correlation calculation, the confidence limit was 95%. In the analysis of character polarity (group under study: species attributed to *Pycnothele* and *Androthelopsis*), *Neodiplothele* Mello-Leitão was used as out-group. The selection of the out-group was based on the results given by Raven (1985:45).

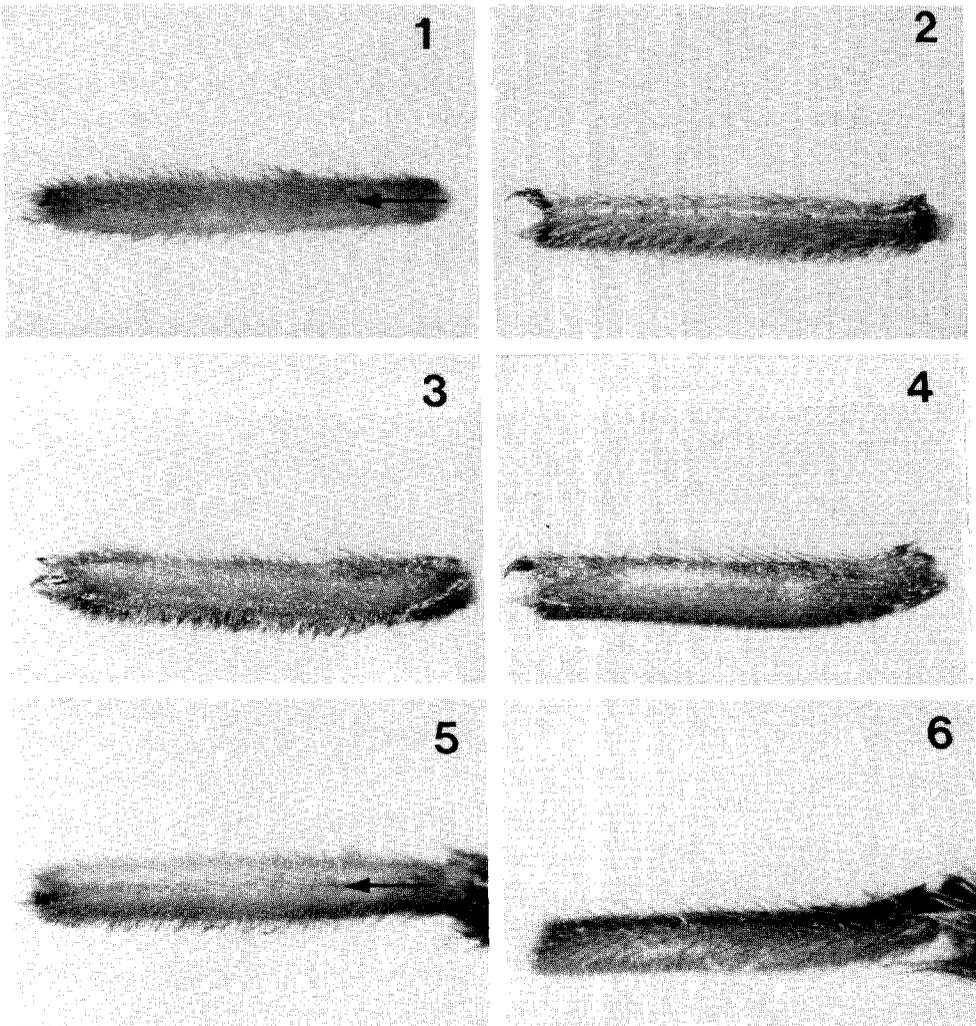
Abbreviations.—British Museum (Natural History), London, England (BMNH); Instituto Butantan, São Paulo, Brazil (IB); Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentine (MACN); Museum of Comparative Zoology, Harvard University, Cambridge, USA (MCZ); Museo Nacional de Historia Natural, Montevideo, Uruguay (MNHN). AME= anterior median eyes; ALE= anterior lateral eyes; PME= posterior median eyes; PLE= posterior lateral eyes.

CHARACTER ANALYSIS

Integral/pseudosegmented tarsi.—This character was introduced into the systematics of Pycnothelinae by Raven (1985:11). The criteria used to define the pseudosegmented character state were “. . . tarsi have either a ventral transverse suture (“cracked”), or the cuticle of the lower surface is pallid and has shattered appearance like drying mud (“pseudosegmented”). Pseudosegmented tarsi appear either bent or curved”. The definition of this character is considered undesirable because it implies, at least, three attributes reduced to a double state character. Each attribute could vary independently and no homologies can be established among them. We think it is correct to develop it into three characters: cracked / not cracked; curved / not curved; and pallid / not pallid.

Raven (1985:100) used only the integral tarsi of females to distinguish between *Pycnothele* and *Androthelopsis*. Such a character is not comparable because females of *Androthelopsis* are unknown.

Raven (1985:100 and 101) mentioned tarsi I-II (in males of *Pycnothele*) and (apparently) I-IV (in *Androthelopsis*) as being pseudosegmented. We examined the types and did not observe “cracked” tarsi in either *Pycnothele* or *Androthelopsis* (Figs. 5 and 6). Species attributed to both genera have tarsi lightly curved (Figs. 2, 4, 6). The pallid condition of the tarsi shows intraspecific



Figs. 1-6.—Tarsi IV from holotype males of species of *Pycnothele*: 1, 3, 5, ventral views; 2, 4, 6, lateral views; 1, 2, *P. auronitens* (= *P. auripilus* = *A. modestus* [in part]) 3, 4, *P. perdita*; 5, 6, *P. singularis* (= *A. singularis* = *A. modestus* [in part]). Arrows show the stripe of longer setae dividing scopulae (scopulae divided).

variation, which also would be an artifact of preservation. The absence of morphological gaps in these characters do not support the separation of genera.

Entire/divided scopulae on tarsi IV.—The character entire/divided scopulae, has been traditionally used in the systematics of Mygalomorphae to separate genera and subfamilies (Schiapelli & Gerschman 1973:43). The type of *P. perdita* presents entire scopulae on tarsi IV (Fig. 3). The holotype and other specimens of *P. auronitens* examined and species attributed to *Androthelopsis* by Raven (1985:101 and 102) present the scopulae on tarsi IV longitudinally divided by a stripe of longer setae (Figs. 1 and 5). Raven (1985:100) described scopulae on tarsi IV as entire in *Pycnothele* (males); our results confirm that description for *P. perdita*; however, the type of *P. auronitens* presents divided scopulae on tarsi IV. There are two ways to interpret this: (1) *P. auronitens* is either misplaced in *Pycnothele* or (2) the character lacks diagnostic value. *Neodiplothele* has divided

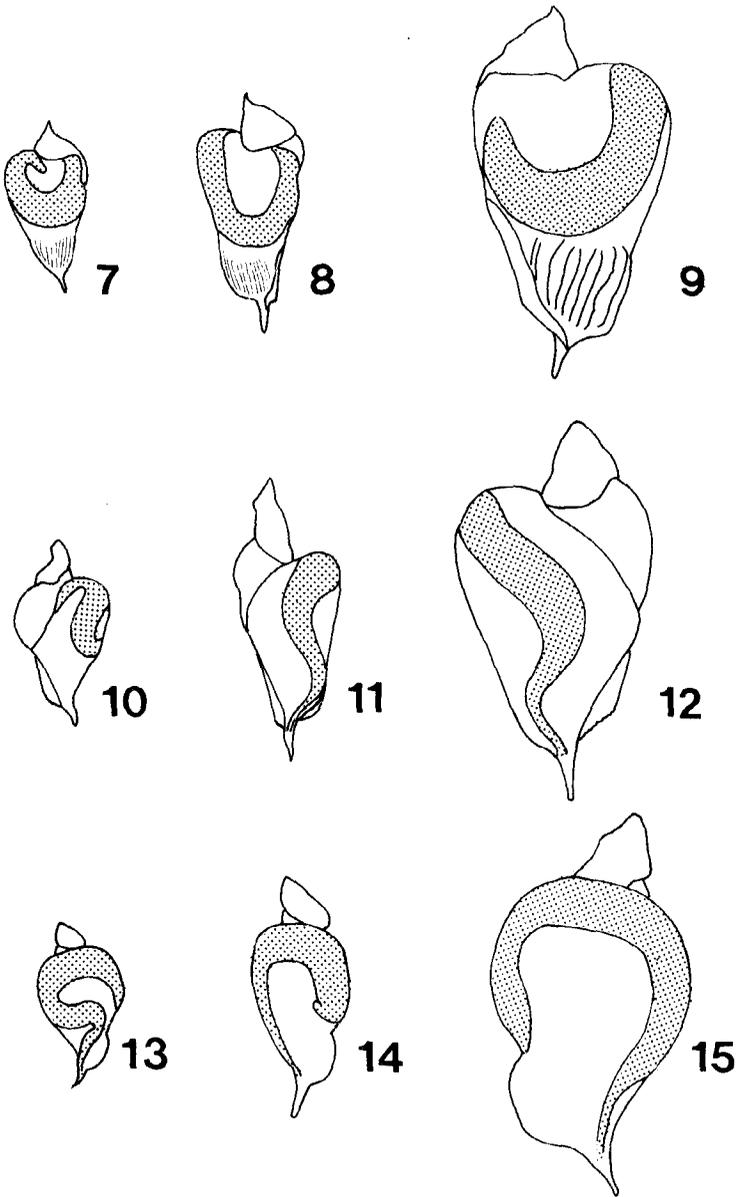
scopulae on tarsi IV (Raven 1985:102); by out-group comparison, divided scopulae constitute a plesiomorphy. By the criterion of ontogenetic precedence, scopulae division disappears during growth in some Mygalomorphae (Theraphosidae) (Schiapelli & Gerschman 1973:43); this would corroborate such hypothetical polarity. In the group under study, entire scopulae on tarsi IV can be interpreted as an autapomorphy of *P. perdita*. Therefore, this character appears to be diagnostically useless in these genera. It does not support the separation of genera.

Palpal bulb morphology.—The species attributed to *Pycnothele* and *Androthelopsis* present palpal bulbs with similar morphology. They are pyriform with a conspicuous subapical constriction and a short (5-9% of the bulb length) and narrow (5-10% of maximum bulb width) embolus. Bulbs possess subapical wide vanes, considered as a synapomorphy in these taxa (Raven 1985:45).

In *Pycnothele*, Raven (1985:100) describes: “very high vanes” and in *Androthelopsis* (1985:101): “high vanes”. In the study of the types and other material examined, it was observed that vane height varies directly with bulb size ($r = 0.769$, $p < 0.01$), and body size ($r = 0.755$, $p < 0.05$). Bulb size was also correlated with body size ($r = 0.984$, $p < 0.01$). The difference pointed out for this character does not constitute a morphological discontinuity that permits a clear delimitation of states. Still, if one were to consider the “very high vanes” state as differentiable (ignoring the correlation with bulb size), it would be exclusively applicable to *P. perdita* (which has bulbs of perceptibly greater size than the remaining species studied). This condition could be interpreted as a specific autapomorphy, without importance in the separation of genera. Consequently, this character appears to be of no value in separating *Pycnothele* from *Androthelopsis*.

The species attributed to *Pycnothele* and *Androthelopsis* share the presence of a well differentiated embolus, short and narrow, that can be distinguished from the rest of the Pycnothelinae. In bulbs having a well differentiated embolus, the short embolus has been considered as plesiomorphic of the Nemesiidae (Raven 1985:80). In the Pycnothelinae, excepting the group submitted to study, the rest of the genera have bulbs with the embolus little or not differentiated (*Neodiplothele*, *Rachias*, *Pselligmus*); or differentiated and long (*Chaco*). According to Raven, (1985:45) *Neodiplothele* is a sister genus of *Pycnothele* plus *Androthelopsis*; *Chaco* is a sister genus of these three. These facts question the mentioned polarity for embolus characters. However, the data are too fragmentary to reach any conclusion. Omitting the polarity of such characters and analyzing them in terms of similarity, embolus morphology becomes useful to distinguish the species attributed to *Pycnothele* and *Androthelopsis* from the rest of the Pycnothelinae.

In the Mygalomorphae, the bulbal duct (“spermophor”) is sclerotized in part of its length and it often appears fused with the exterior bulb wall (Kraus 1984:377). This secures the stability of such a structure for its use as a systematic character. The tract of the bulbal duct can be directly observed through the bulb cuticle in Pycnothelinae. *P. auronitens* (= *P. auripilus*) has the subterminal part of the duct strongly curved, in the proximal sense (Figs. 10, 13). This character differs perceptibly from that of other species studied (Figs. 11-15). It is not possible to determine the polarity of these bulbal duct character states due to absence of data in the out-group; however, they clearly distinguish *P. singularis* (= *P. modestus*)



Figs. 7-15.—Palpal bulbs from holotype males of species of *Pycnothele*: 7-9, dorsal views; 10-12, ventral views; 13-15, prolateral views; 7, 10, 13, *P. auronitens* (= *P. auripilus* = *A. modestus* [in part]) (left bulb); 8, 11, 14, *P. singularis* = *A. singularis* = *A. modestus* [in part]) (left bulb); 9, 12, 15, *P. perditia* (right bulb). Shaded area represents visible tract of bulbal duct.

and *P. auronitens* (= *P. auripilus*). Differences in bulb morphology between the types of *P. auronitens* and *P. auripilus* were not found. The bulb of the type of *P. auripilus* is more pallid, possibly due to the use of clearing techniques or to the preservation method. This fact probably made observation of the structures difficult for the previous authors. Except for a little difference in size, other differences in bulb morphology between the types of *A. singularis* and *A. modestus* were not found. Bulbal duct tract is considered useful as a specific character.

Cuspules.—The presence of cuspules on maxillae is shared by all species attributed to *Pycnothele* and *Androthelopsis*. Number of maxillary cuspules was used as a diagnostic character between *Pycnothele* and *Pycnothelopsis* (sub *Androthelopsis*) by Schiapelli & G. de Pikelin (1967). Capocasale & Pérez-Miles (1979) analyzed the value of this character in *Pycnothelopsis*, discarding it as generic and specific character because it overlaps with the mentioned values for *Pycnothele* and because it presents high intraspecific variability. These results were confirmed in the present analysis. Raven (1985:79) considers the presence of maxillary cuspules as a plesiomorphy of Nemesiidae; this criterion agrees with our results in the group submitted to study.

The presence of cuspules on the labium is shared by the species of the group under study (Figs. 16-18), except in the type of *Heteromma anomala*. This character was used by Schiapelli & G. de Pikelin (1967). Capocasale & Pérez-Miles (1979) concluded that like the maxillary cuspules, it lacks diagnostic value at the generic or specific level in *Pycnothelopsis* (sub *Androthelopsis*).

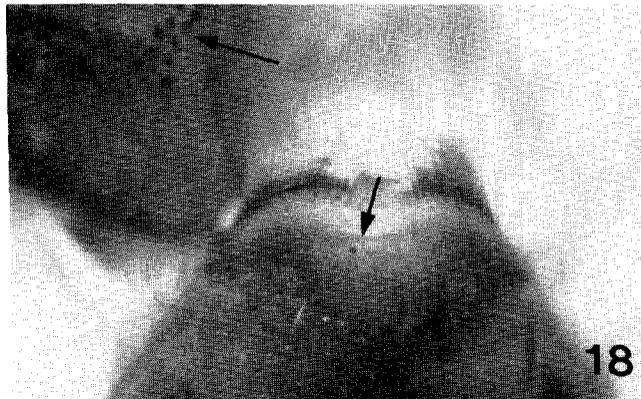
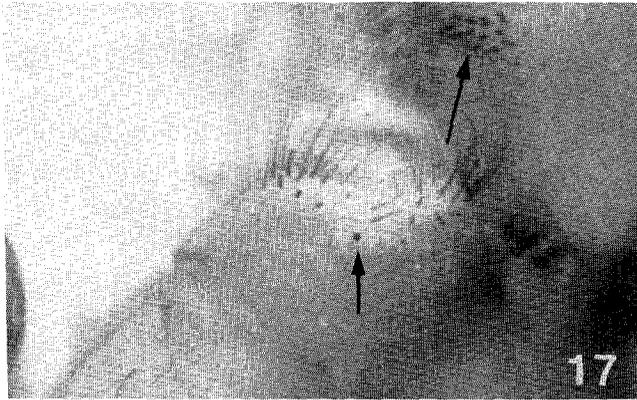
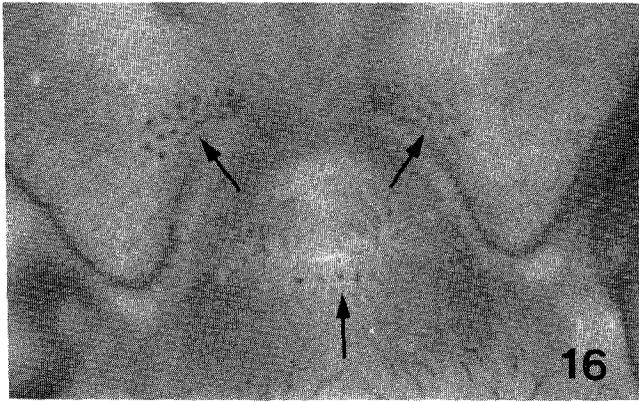
Raven (1985:100, 101) indicated "No cuspules on labium" in the descriptions of both genera. This statement is only valid for the type of *H. anomala* but does not have a factual basis for other species studied. It was not possible to establish the polarity of the labial cuspules in the Pycnothelinae. However, Raven (1985:79) indicated that "labium with few cuspules" would represent a plesiomorphy in Nemesiidae.

According to the results obtained, we conclude that both maxillary cuspules and labial cuspules do not support the separation of genera.

Eyes.—Eye dimensions have been used as diagnostic characters separating *Pycnothele* and *Pycnothelopsis* (sub *Androthelopsis*) by Schiapelli & G. de Pikelin (1967).

The correlation analysis between eye dimensions (maximum diameter) and body size (length of carapace) in the specimens of the group under study, gave the following results: AME/carapace $r=0.805$; ALE/carapace $r=0.932$; PME/carapace $r=0.737$; PLE/carapace $r=0.854$. These values indicate a significant correlation at the 95% level. This leads us to question the systematic value of this character, as it is empirically correlated with size.

To avoid variations due to size of specimens, eye dimensions were studied in a relative way (maximum diameter/carapace length). Significant differences in the relative dimensions of eyes between the type of *P. perditus* and the sample of *P. singularis* (= *A. singularis* = *P. modestus*) were not found. In the comparison of *P. perditus* with *P. auronitens* (= *P. auripilus* = *A. modestus* in part) AME and PME presented significant differences ($t=10.42$; $P < 0.001$ and $t=4.02$; $P < 0.02$ respectively). Significant differences for ALE and PLE were not found. (In the type of *P. auronitens* the right PLE is ectopic and of lesser size. It was not used in the comparison). In the comparison between the samples of *P. auronitens* and *P. singularis* only ALE show significant differences ($t=2.04$; $P < 0.05$). The two species placed in different genera (*P. perditus* and *P. singularis*) by Raven (1985:100, 101) do not show differences in these characters. *P. perditus* and *P. auronitens* placed by Raven (1985:100) in the same genus, have differences in the relative size of AME and PME. Taking into account the absence of data that could permit us to determine polarity of these characters, and the results obtained, they are considered to be specific level characters. Such characters do not support the separation of genera.



Figs. 16-18.—Labia and maxillae of male holotype of species of *Pycnothele*, ventral views: *P. auronitens* (= *P. auripilus* = *A. modestus* [in part]); 17, *P. perditai*; 18, *P. singularis* (= *A. singularis* = *A. modestus* [in part]). Arrows show cuspules.

Genus *Pycnothele* (Chamberlin, 1917)

Pycnothele Chamberlin, 1917:26; Mello-Leitão 1923:39; Petrunkevitch 1928:73; 1940:303; Berland 1932:329; Gerhardt & Kaestner 1939:591; Neave 1940:1051; Roewer 1942:275; Schiapelli & Gerschman 1942:319; Schiapelli & G. de Pikelin 1965:15; 1967:53; G. de Pikelin & Schiapelli 1970:100; Bonnet 1958:3836; Pérez-Miles & Capocasale 1983:2; Raven 1985:100.

Trechona: Keyserling 1891:16 (in part).

Crysidromus: Simon 1903:931 (in part); Bücherl 1952:132 (in part).

Metriopelma: Pocock 1903:112 (in part); Mello-Leitão 1923:168 (in part); Bonnet 1957:2826 (in part).
Androthelopsis Mello-Leitão, 1934:402; Roewer 1942:217; Bonnet 1955: 322; Raven 1985:101. NEW
 SYNONYMY.
Heteromma Mello-Leitão, 1935:356 (preoc. by *Heteromma* Menge 1856, in Neave 1939:640); Bonnet
 1957:2184.
Agersborgia Strand, 1936:167 (new name for *Heteromma*); Bonnet 1955: 205.
Pycnothelopsis Schiapelli & Gerschman, 1942:319; Schiapelli & G. de Pikelin 1965:15; 1967:59;
 Bücherl 1957:408; Capocasale & Pérez-Miles 1979:1 (in part); Pérez-Miles & Capocasale 1982:1 (in
 part); 1983:1.

Diagnosis.—*Pycnothele* differs from other Pycnothelinae because the males possess bulbs with differentiated short emboli and subapical wide vanes (Figs. 7-15); in females, spermathecae each have a long and narrow neck gradually widening apically; fundus subglobulose.

DISCUSSION

Schiapelli & Gerschman (1942) established the separation between *Pycnothele* and *Pycnothelopsis* according to the following characters: scopulae extension on metatarsi I and II, labial and maxillary cuspulae and ocular dimensions. Capocasale & Pérez-Miles (1979) and Pérez-Miles & Capocasale (1982, 1983) invalidated some characters considered as diagnostic in these genera, although they maintained them as separate taxa.

Raven (1985:101) established the synonymy between *Pycnothelopsis* and *Androthelopsis*, maintaining the species under study in two separate genera: *Pycnothele* and *Androthelopsis*. This author based the separation on the following characters: integral/pseudosegmented tarsi and height of vanes on bulb.

According to the preceding analysis, the characters considered as diagnostic of *Pycnothele* and *Androthelopsis* have no value. The mentioned differences between these genera are either erroneous or do not justify that they be maintained as separate taxa.

Proper synapomorphies of each genus that can justify their separate existences as monophyletic groups were not found. Raven (1985:45) indicated that wide vanes on the bulb are a synapomorphy of *Pycnothele* plus *Androthelopsis* (sister groups). We agree with this author in the polarity assigned to the character, but we consider that it is a synapomorphy of generic level, which indicates the monophyly of the species attributed to both genera. Using similarity criteria, bulb morphology and embolus length are more similar among the species attributed to *Pycnothele* and *Androthelopsis* than they are between any of these species and the other members of the Pycnothelinae.

A significant morphological discontinuity observed among the species attributed to *Pycnothele* and *Androthelopsis* involved the character, entire/divided scopulae of tarsi IV. This character has been traditionally used to separate genera in Mygalomorphae. If only this character is considered, the species would be placed in two genera; (1) *Androthelopsis* plus *P. auronitens*, with divided scopula and (2) *Pycnothele* (monospecific). But since divided scopulae on tarsi IV are plesiomorphic, *Androthelopsis* plus *P. auronitens* would constitute a genus based on symplesiomorphy. If *Pycnothele* remained as a monospecific genus and sister group of *Androthelopsis* (*sensu* Raven 1985), both

taxa would be paraphyletic (*sensu* Platnick 1976). Other morphological discontinuities justifying the existence of *Pycnothele* and *Androthelopsis* as separated genera were not found.

The results obtained have induced us to establish the synonymy between *Pycnothele* and *Androthelopsis*. *Pycnothele* (valid name for priority ICZN, art. 23) would be based on the following synapomorphy: wide and conspicuous subapical vanes on bulb (Figs. 7-15).

KEY TO SPECIES OF THE GENUS *PYCNOTHELE*

Males

1. Scopulae entire on tarsi IV (Fig. 3).....*P. perdita*
Scopulae on tarsi IV, divided by a stripe of thicker and longer setae.....2
- 2.- Bulbal duct presenting a strong subterminal curvature basally (Figs. 7, 10, 13)*P. auronitens*
Bulbal duct without such curvature (Figs. 8, 11, 14)*P. singularis*

Pycnothele auronitens (Keyserling, 1891)

Figs. 1, 2, 7, 10, 13, 16

Trechona auronitens Keyserling, 1891:16.

Metriopelma auronitens: Pocock 1903:114; Mello-Leitão 1923:173; Petrunkevitch 1939:279; Bonnet 1957:2826; 1959:4680.

Crypsidromus auronitens: Simon 1903:931; Bücherl 1952:132.

Psalistops auripilus Mello-Leitão, 1946:8. NEW SYNONYMY.

Pycnothelopsis modestus: Schiapelli & G. de Pikelin 1971:61 (in part).

Pycnothelopsis auripilus: Capocasale & Pérez-Miles 1979:3 (in part); Pérez-Miles & Capocasale 1982:1.

Pycnothelopsis auronitens: Pérez-Miles & Capocasale 1983:2.

Androthelopsis modestus: Raven 1985:102 (in part). NEW SYNONYMY.

Pycnothele auronitens: G. de Pikelin & Schiapelli 1970:100; Raven 1985:100.

Diagnosis.—*P. auronitens* differs from *Pycnothele perdita*, by the scopula on tarsus IV which is divided by a stripe of longer setae; from *P. singularis* by the strong proximal curvature of the bulb duct tract (visible in ventral and prolateral views) (Figs. 10-13).

Description.—*Male* ($N=4$): Carapace, length: 5.6-7.2 mm (mean = 6.28 ± 0.73 SD), width: 4.4-5.1 mm (mean = 4.75 ± 0.35 SD). Fovea procurved. Chelicerae without rastellum, intercheliceral tumescence present. Ocular tubercle well defined, longer than wide; AME: 0.18-0.25 mm (mean = 0.11 ± 0.03 SD); ALE: 0.20-0.30 mm (mean = 0.26 ± 0.04 SD); PME: 0.15-0.20 mm (mean = 0.18 ± 0.03 SD); PLE: 0.23-0.35 mm (mean = 0.28 ± 0.05 SD). Labium with 3-5 cuspules. Maxillae subrectangular, distal prolateroventral lobe pronounced, proximal prolateroventral lobe with numerous cuspules. Tibial apophysis absent. Tarsi without spines, with two bipectinated claws. Scopulae on tarsi I-III entire, on tarsi IV divided in half by a longitudinal stripe of longer setae. Apical scopulae on metatarsi I and II; III and IV without scopulae. Sternal sigilla marginal. Anterior spinnerets monoarticulated, short; posterior spinnerets triarticulated, apical segment short and domed. Palpal bulb pyriform with

subapical wide vanes, embolus differentiated, short; duct-tract of bulb presenting a strong subterminal curvature proximally (visible in ventral and prolateral views).

Discussion.—This species was placed in *Pycnothele* by G. de Pikelin & Schiapelli (1970). *Psalistops auripilus* (Mello-Leitão, 1946), was transferred to *Pycnothelopsis* by Schiapelli & G. de Pikelin (1971) (not by Capocasale & Pérez-Miles (1979), as Raven said (1985:102)) and placed in the synonymy of *P. modestus*. Capocasale & Pérez-Miles (1979) separated this synonymy into two species: *Pycnothelopsis auripilus* and *Pycnothelopsis modestus*. Pérez-Miles & Capocasale (1983) transferred *P. auronitens* to *Pycnothelopsis* establishing the specific synonymy *P. auronitens* = *P. auripilus*. Raven (1985) did not accept this synonymy and placed *P. auronitens* back in *Pycnothele* and *P. auripilus* in *Androthelopsis*. He based the change on the fact that *P. auronitens* shares with *Pycnothele*: (1) the absence of pseudosegmented tarsi in the male and (2) elevated vanes on the bulb. The first character state is at odds with his own statement that tarsi I and II of male *Pycnothele* are pseudosegmented. In any case, both characters became useless as a result of the present analysis. In our present study important differences were not found between the types of *P. auronitens* and *P. modestus*. This confirms the specific synonymy established by Pérez-Miles & Capocasale (1983).

The synonymy established again by Raven (1985) between *A. modestus* (= *P. singularis*) and *P. auripilus* (= *P. auronitens*) is overturned. These species are distinguished by the characters mentioned in the diagnosis which agree with the results obtained by Capocasale & Pérez-Miles (1979).

Material examined.—**BRAZIL:** Rio Grande, Taquara, holotype male of *Pycnothele auronitens* (BMNH). **URUGUAY:** Lavalleja, Arequita (C. de Zolessi) 1 male (MNHN); Maldonado, Sierra de las Animas (Pérez, Delgado) 1 male (MNHN); Florida, holotype male of *Psalistops auripilus* (MNHN).

Pycnothele perdita Chamberlin, 1917

Figs. 3, 4, 9, 12, 15, 17

Pycnothele perdita Chamberlin, 1917:26; Roewer 1942:275; Bonnet 1958:3836; Schiapelli & Gerschman 1942:319; Schiapelli & G. de Pikelin 1965:15; 1967:54; Pérez-Miles & Capocasale 1983:2; Raven 1985:100. *Pycnothele perditus* (sic): Mello-Leitão 1923:40; Petrunkevitch 1928:73; Schiapelli & G. de Pikelin 1967:48.

Diagnosis.—Males of *P. perdita* differ from other *Pycnothele* species by their entire scopulae on tarsi IV and by their bulb morphology (Figs. 9, 12, 15).

Description.—*Male:* Carapace, length: 14.5 mm; width: 12.2 mm. Fovea procurved. Chelicerae without rastellum, intercheliceral tumescence present. Ocular tubercle well defined, longer than wide; AME: 0.75 mm; ALE: 0.50 mm; PME: 0.28 mm; PLE: 0.50 mm. Labium with 3 cuspules (2 visible plus a base). Maxillae subrectangular, distal prolateroventral lobe pronounced, proximal prolateroventral lobe with numerous cuspules. Tibial apophysis absent. Tarsi without spines, with two bipectinated claws. Scopulae on tarsi I-IV entire. Apical scopulae on metatarsi I and II; III and IV without scopulae. Sternal sigilla marginal. Anterior spinnerets monoarticulated, short; posterior spinnerets triarticulated, apical segment short and domed. Palpal bulb pyriform with subapical wide vanes; embolus differentiated, short; duct tract of bulb gently curved in ventral view (Fig. 15).

Female: Carapace length: 17 mm; width: 13 mm; AME: 0.54 mm; ALE: 0.51 mm; PME: 0.20 mm; PLE: 0.51 mm. Labium with 1 cuspule. Scopulae on tarsi I and II entire; III and IV divided. Spermathecae with long and narrow neck, gradually widening apically, fundus subglobulose. Other characters as in male.

Material examined.—**BRAZIL**: Rio Parahyba, holotype male and paratype female (MCZ).

Pycnothele singularis (Mello-Leitão, 1934) NEW COMBINATION

Figs. 5, 6, 8, 11, 14, 18

Androthelopsis singularis Mello-Leitão, 1934:402; Roewer 1942:217; Bonnet 1955:322; Raven 1985:101.

Pycnothelopsis modestus Schiapelli & Gerschman, 1942:319 NEW SYNONYMY; Schiapelli & G. de Pikelin 1965:15; 1967:59; 1971:61 (in part); Bücherl 1957:405; Capocasale & Pérez-Miles 1979:4; Pérez-Miles & Capocasale 1982:1; 1983:4; Brignoli 1983:142.

Androthelopsis modestus: Raven 1985:102 (in part) NEW SYNONYMY.

Diagnosis.—*P. singularis* differs from *P. perdita*, by having the scopulae on tarsi IV divided; and from *P. auronitens*, by the tract of bulb which lacks subterminal curvature (Figs. 8, 11, 14).

Description.—*Male* ($N=6$): Carapace, length: 6.1-11.0 mm (mean = 8.23 ± 1.75 SD), width: 4.6-7.5 mm (mean = 6.43 ± 1.05 SD). Fovea procurved. Chelicerae without rastellum, intercheliceral tumescence present. Ocular tubercle, well defined, longer than wide; AME: 0.18-0.30 mm (mean = 0.24 ± 0.04 SD); ALE: 0.23-0.35 mm (mean = 0.30 ± 0.05 SD); PME: 0.15-0.30 mm (mean = 0.22 ± 0.05 SD); PLE: 0.20-0.35 (mean = 0.29 ± 0.06 SD). Labium with 1-4 cuspules. Maxillae subrectangular, distal prolateroventral lobe pronounced, proximal prolateroventral lobe with numerous cuspules. Tibial apophysis absent. Tarsi without spines, with two bipectinated claws. Scopulae on tarsi I-III entire, scopulae on tarsi IV divided by a longitudinal stripe of longer setae. Apical scopulae on metatarsi I and II; III and IV without scopulae. Sternal sigilla marginal. Anterior spinnerets triarticulated; apical segment short, domed. Palpal bulb pyriform with subterminal wide vanes; embolus differentiated, short; duct-tract of bulb gently curved in ventral view (Fig. 11).

Discussion.—*P. modestus* was transferred to the genus *Androthelopsis* by Raven (1985:101) who maintained it as a different species from *A. singularis*. In the type comparison, except for slight differences in size, other important differences in the characters studied were not found. This is the basis of the specific synonymy here established. As a result of the generic synonymy (*Pycnothele* = *Androthelopsis*), the name *Pycnothele singularis*, must prevail by priority (ICZN, art. 23).

The synonymy established between *A. modestus* (= *P. singularis*) and *P. auripilus* (= *P. auronitens*) by Raven (1985:161) is considered incorrect. These species are differentiated by the characters indicated in the diagnosis.

Material examined.—**BRASIL**: SÃO PAULO; Alto da Serra, holotype male of *Androthelopsis singularis* (IB). **ARGENTINA**: SANTIAGO DEL ESTERO; Colonia Dora (Prosen), holotype male of *Pycnothelopsis modestus* (MACN); CÓRDOBA (Mansilla) 1 male (MACN); CHACO; Colonia Benítez, 1 male (MACN); ENTRE RÍOS; Paraná, 1 male (MACN). **URUGUAY**: CERRO LARGO; Río Tacuarí (Costa; Pérez) 1 male (MNHN); ARTIGAS; Cerro del Zorro (Gudynas; Skuk) 1 male (MNHN); Arroyo de la Invernada, 1 male (MNHN); SALTO, Río Arapey (Shanon) 2 males (MNHN).

UNCERTAIN SPECIES OF *PYCNOTHELE*

Heteromma anomala Mello-Leitão, 1935:356. Holotype male from Brazil, Rio de Janeiro (IB) examined. According to the morphology of the bulb, we agree with Raven (1985) who placed this species in *Pycnothele* (next to *P. perdita*). However, (1) it has no cuspules on the labium and (2) tarsi IV are absent in the holotype. Mello-Leitão (1934) did not say if the scopulae on tarsi IV are entire or divided. For these reasons, at present, it is not possible to reach a conclusion and it can only be considered as unidentifiable.

ACKNOWLEDGMENTS

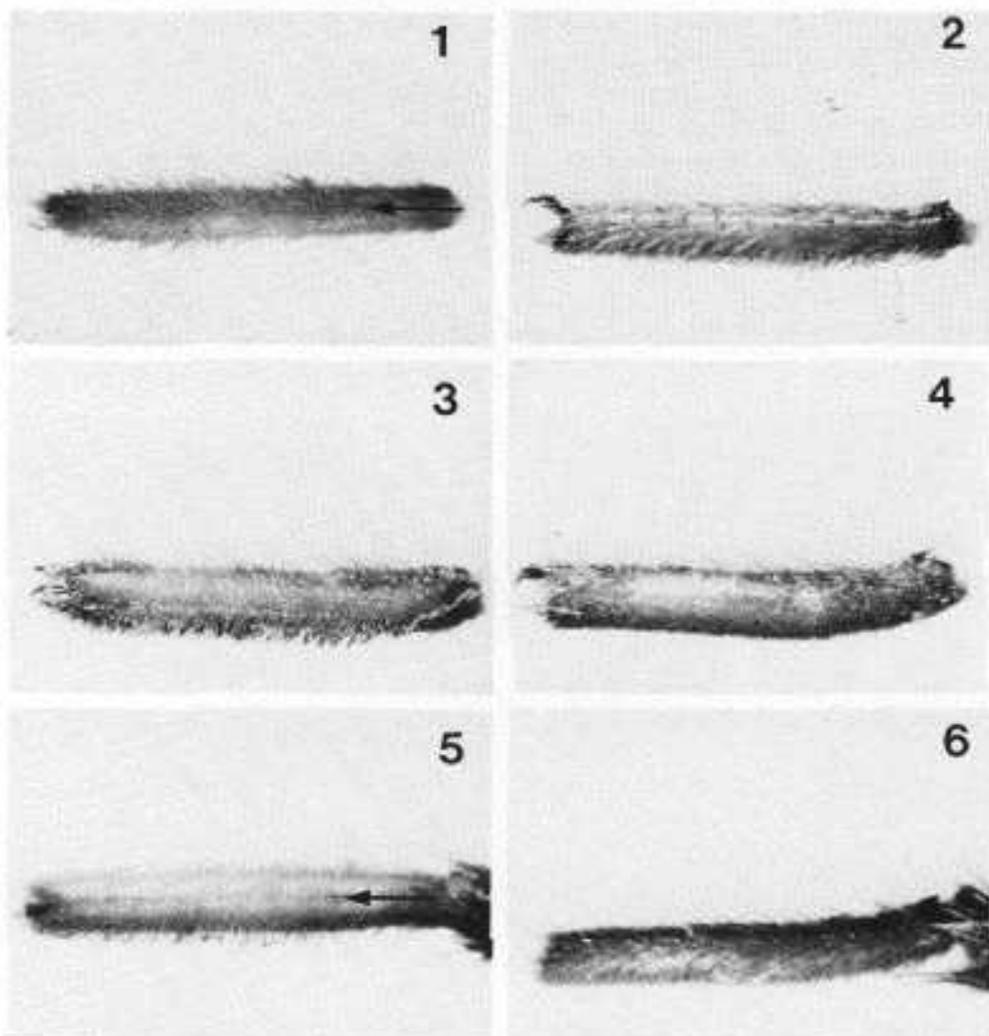
We are very grateful to the following persons for the loan of collection specimens: P. H. Hillyard (BMNH), H. W. Levi (MCZ), S. Lucas (IB), E. Maury (MACN) and to Dr. F. Coyle and Dr. R. Raven for the reviews. We also acknowledge the help of Prof. Nelly P. de Pérez in translation and typing of the draft of this paper and to Dr. O. Hawksley for the suggestions and corrections of the English.

LITERATURE CITED

- Berland, L. 1932. Les Arachnides, Encyclop. entom., Lechevalier, Paris. 16:1-485.
- Bonnet, P. 1955. Bibliographia Araneorum. Toulouse, 2 pt. 1:1-918.
- Bonnet, P. 1957. Bibliographia Araneorum. Toulouse, 2 pt. 3:1927-3026.
- Bonnet, P. 1958. Bibliographia Araneorum. Toulouse, 2 pt. 4:3027-4230.
- Brignoli, P. M. 1983. A Catalogue of the Araneae Described Between 1940 and 1981. Manchester University Press, Manchester, 755 pp.
- Bücherl, W. 1952. Aranhas do Rio Grande do Sul. Mem. Inst. Butantan, 24(2):127-156.
- Bücherl, W. 1957. Sobre a importancia dos bulbos copuladores e das apofisis tibiais dos machos na sistemática das aranhas caranguejeiras (Orthognatha). An. Acad. Bras. Ciên., 29:377-416.
- Capocasale, R. M., & F. Pérez-Miles. 1979. Arañas del Uruguay, II. Nuevos aportes al género *Pycnothelopsis* Schiapelli y Gerschman, 1942 (Araneae, Psychothelidae). Com. Zool. Mus. Hist. Nat. Montevideo, 10(141):1-9.
- Chamberlin, R. V. 1917. New spiders of the Family Aviculariidae. Bull. Mus. Comp. Zool, Harvard University, 61(3):25-75.
- Gerhardt, U. and A. Kästner. 1938. Araneae. In: Handbuch der Zoologie. Kükenthal & Krumbach, Berlin, Leipzig, 3(2):497-656.
- Gerschman de Pikelin, B. S. y R. D. Schiapelli. 1970. Posición sistemática de *Metriopelma auronitens* (Keys. 1891) (Araneae: Mygalomorphae). Rev. Soc. Ent. Argentina, 32(1-4):99-102.
- Gerschman de Pikelin, B. S. y R. D. Schiapelli. 1973. La subfamilia "Ischnocolinae" (Araneae: Theraphosidae). Rev. Mus. Cienc. Nat. Buenos Aires, 4(2):43-77.
- International Commission on Zoological Nomenclature. 1985. International Code of Zoological Nomenclature, 3rd ed., International Trust for Zoological Nomenclature, London, 338 pp.
- Keyserling, G. E. 1891. Die Spinnen Amerikas. Brasilianische Spinnen, Band 3, Verlag von Bauer & Raspe, Nurenberg, 278 pp.
- Kraus, O. 1984. Male spider genitalia: Evolutionary changes in structure and function. Verh. naturwiss. Ver. Hamburg, 27:373-382.
- Mello-Leitão, C. 1923. Theraphosoideas do Brasil. Rev. Mus. Paulista 13:1-435.
- Mello-Leitão, C. 1934. Tres aranhas novas nas colleções do Instituto Butantan. Mem. Inst. Butantan, 8:401-407.
- Mello-Leitão, C. 1935. Tres novas aranhas tetrapneumones nas colleções do Instituto Butantan. Mem. Inst. Butantan, 9:355-360.
- Mello-Leitão, C. 1946. Nuevos arácnidos sudamericanos para la colección del Museo de Historia Natural de Montevideo. Com. Zool. Mus. Hist. Nat. Montevideo, 2(35):1-10.

- Neave, S. A. 1939. Nomenclator Zoologicus. The Zoological Society of London. London, 2:1025.
- Pérez-Miles, F. y R. M. Capocasale. 1982. Arañas del Uruguay, IV. Hallazgo de una tercera especie del género *Pycnothelopsis*: *Pycnothelopsis tacuariensis* sp. nov. (Araneae, Pycnothelidae). Com. Zool. Mus. Hist. Nat. Montevideo, 11(147):1-7.
- Pérez-Miles, F. y R. M. Capocasale. 1983. Arañas del Uruguay, VI. Las especies del género *Pycnothelopsis*: *Pycnothelopsis auronitens* (Keyserling, 1891) comb. nov. (Araneae, Pycnothelidae). Aracnología, 1:1-4.
- Petrunkévitch, A. 1928. Systema Araneorum. Trans. Connecticut Acad. Arts. Sc., 29:1-270.
- Petrunkévitch, A. 1940. Catalogue of American Spiders. Trans. Connecticut Acad. Sc., 33:133-338.
- Platnick, N. I. 1976. Are monotypic genera possible? Syst. Zool., 26(2):198-199.
- Pocock, R. I. 1903. On some genera and species of South American Aviculariidae. Ann. Mag. Nat. Hist., (7)11:81-115.
- Raven R. J. 1985. The spider infraorder Mygalomorphae (Araneae): Cladistics and systematics. Bull. Amer. Mus. Nat. Hist., 182(1):1-180.
- Roewer, C. F. 1942. Katalog der Araneae, Band 1, Verlag von "Natura", Bremen, 1040 pp.
- Schiapelli, R. y B. Gerschman. 1942. Arañas argentinas (1). Anal. Mus. Argentina Cs. Nat., 40:317-331.
- Schiapelli, R. D., y B. Gerschman de Pikelin. 1965. Distribución de las arañas Mygalomorphae en la Argentina. Act. II. Congr. Latinoamericano Zool., São Paulo, 1962, 2:11-20.
- Schiapelli, R. D. y B. S. Gerschman de Pikelin. 1967. La familia Pycnothelidae (Chamberlin, 1917) (Araneae-Mygalomorphae). Seg. Jorn. Entomoevid. Argentina, 1:45-64.
- Schiapelli, R. D. y B. S. Gerschman de Pikelin. 1971. Estudio de algunas arañas descritas por Mello-Leitão para el Uruguay. Rev. Soc. Ent. Argentina, 33(1-4):57-62.
- Simon, E. 1903. Histoire naturelle des Araignées 2(4):669-1080, Roret, Paris.
- Strand, E. 1936. Miscellanea nomenclatoria zoologica et palaeontologica IX. Folia Zool. Hydrobiologia, 4:133-147.

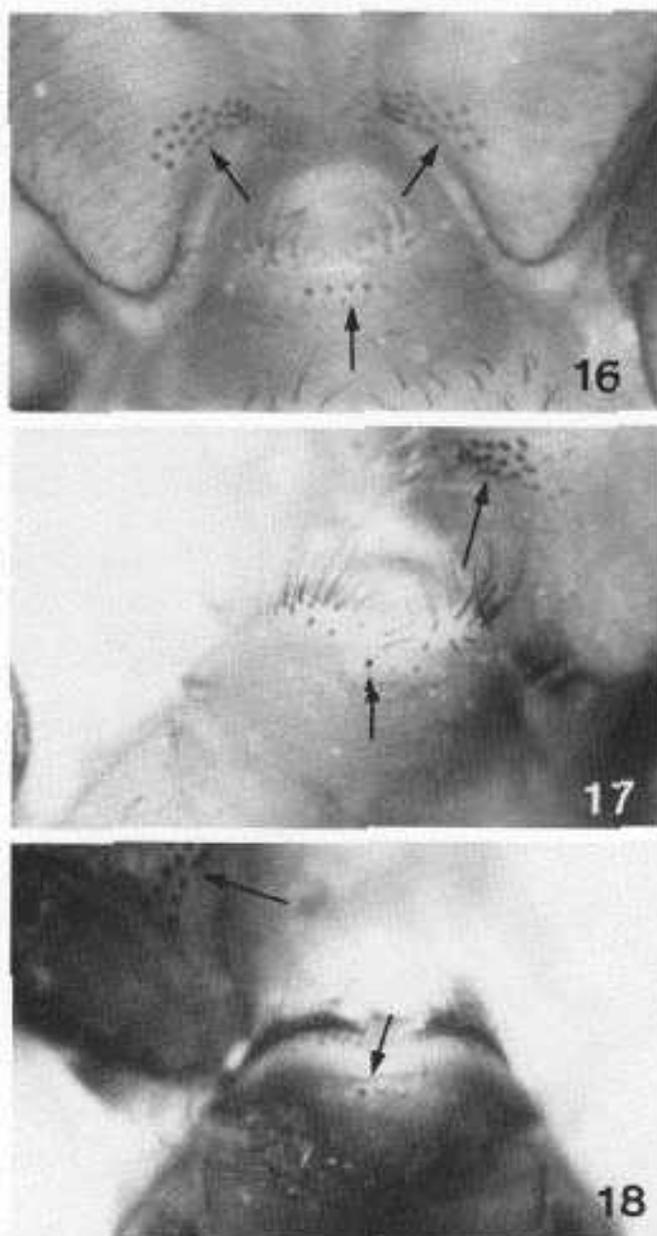
Manuscript received May 1987, revised September 1987.



Figs. 1-6.—Tarsi IV from holotype males of species of *Pycnothele*: 1, 3, 5, ventral views; 2, 4, 6, lateral views; 1, 2, *P. auronitens* (= *P. auripilus* = *A. modestus* [in part]); 3, 4, *P. perdita*; 5, 6, *P. singularis* (= *A. singularis* = *A. modestus* [in part]). Arrows show the stripe of longer setae dividing scopulae (scopulae divided).

variation, which also would be an artifact of preservation. The absence of morphological gaps in these characters do not support the separation of genera.

Entire/divided scopulae on tarsi IV.—The character entire/divided scopulae, has been traditionally used in the systematics of Mygalomorphae to separate genera and subfamilies (Schiapelli & Gerschman 1973:43). The type of *P. perdita* presents entire scopulae on tarsi IV (Fig. 3). The holotype and other specimens of *P. auronitens* examined and species attributed to *Androthelopsis* by Raven (1985:101 and 102) present the scopulae on tarsi IV longitudinally divided by a stripe of longer setae (Figs. 1 and 5). Raven (1985:100) described scopulae on tarsi IV as entire in *Pycnothele* (males); our results confirm that description for *P. perdita*; however, the type of *P. auronitens* presents divided scopulae on tarsi IV. There are two ways to interpret this: (1) *P. auronitens* is either misplaced in *Pycnothele* or (2) the character lacks diagnostic value. *Neodiplothele* has divided



Figs. 16-18.—Labia and maxillae of male holotype of species of *Pycnothele*, ventral views: *P. auronitens* (= *P. auripilus* = *A. modestus* [in part]); 17, *P. perduta*; 18, *P. singularis* (= *A. singularis* = *A. modestus* [in part]). Arrows show cuspules.

Genus *Pycnothele* (Chamberlin, 1917)

Pycnothele Chamberlin, 1917:26; Mello-Leitão 1923:59; Petrunkevitch 1928:73; 1940:303; Berland 1932:329; Gerhardt & Kaestner 1939:591; Neave 1940:1051; Roewer 1942:275; Schiapelli & Gerschman 1942:319; Schiapelli & G. de Pikelin 1965:15; 1967:53; G. de Pikelin & Schiapelli 1970:100; Bonnet 1958:3836; Pérez-Miles & Capocasa 1983:2; Raven 1985:100.

Trechona: Keyserling 1891:16 (in part).

Crypsidromus: Simon 1903:93f (in part); Bücherl 1952:132 (in part).